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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,513	11/21/2006	Tadao Ishibashi	04208.0235	6977

7590 08/08/2008
Finnegan Henderson Farabow Garrett and Dunner
1300 I Street N W
Washington, DC 20005

EXAMINER

SMITH, CHAD

ART UNIT	PAPER NUMBER
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2874

MAIL DATE	DELIVERY MODE
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08/08/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/574,513	Applicant(s) ISHIBASHI ET AL.	
	Examiner Chad H. Smith	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-49 is/are pending in the application.
- 4a) Of the above claim(s) 38-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15 and 25-37 is/are rejected.
- 7) ☒ Claim(s) 16-24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 4/30/06 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/16/07, 4/18/07, 8/28/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Election/Restrictions

Applicant's election without traverse of claims 15 - 37 in the reply filed on 5/29/08 is acknowledged.

Allowable Subject Matter

Claims 16 – 24, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record, taken alone or in combination, fails to disclose or render obvious wherein a first semiconductor clad layer is arranged between each of one main surface and the other main surface of the semiconductor core layer and the second semiconductor clad layer.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 15 is rejected under 35 U.S.C. 102(b) as being anticipated by Anayama et al. (U.S. Patent # 5,799,027).

'027 teaches a semiconductor optoelectronic waveguide comprising: a second semiconductor clad layer arranged on each of one main surface and the other main surface of a semiconductor core layer having electro-optical effects (4 and 6); a pn junction layer arranged on the second semiconductor clad layer laminated on one main surface of the semiconductor core layer wherein the side of the second semiconductor clad layer is a p-type (7b) and the side opposed to the second semiconductor clad layer is an n-type (7a); and a third semiconductor clad layer arranged on the pn junction layer (8) and the second semiconductor clad layer laminated on the other main surface of the semiconductor core layer (3). Furthermore, the functional recitation that "the third semiconductor layer is functioning as an n-type electrode layer" is insufficient to patentable distinguish the claimed apparatus from the apparatus disclosed by (Anayama t al.) because it is narrative in form. In order to be given patentable weight, a functional recitation must be expressed as a "means" for performing the specified function, as set forth 35 U.S.C. 112, 6th paragraph, and must be supported by recitation in the claim of sufficient structure to warrant the presence of the functional language. *In re Fuller*, 1929 C.D. 172; 388 O.G. 279.

In Re claim 25, '027 teaches wherein the pn junction layer is established for the thickness of each layer and the impurity concentration in such a way that under an operating state of the semiconductor optoelectronic waveguide, the p layer is depleted in a whole range while the n layer is at least partially depleted (col. 24, lines 20 – 24).

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In Re claims 26 and 29, '027 teaches wherein the impurity concentration is $1 \times 10^{17} \text{ cm}^{-3}$ or greater for the p layer of the pn junction layer and $5 \times 10^{17} \text{ cm}^{-3}$ or greater for the n layer (col. 24, lines 20 - 24).

In Re claims 27, 30 and 32, '027 teaches wherein an impurity forming a deep level is doped on the n layer of the pn junction layer, in addition to an n-type impurity (col. 24, lines 29 – 38).

In Re claims 28, 31, 33, and 36, '027 teaches wherein a band gap energy of the n layer of the pn junction layer is smaller than that of the p-layer of the pn junction layer (col. 20, lines 9 – 16).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 34, 35 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Anayama et al. (U.S. Patent # 5,799,027) in view of Leon et al. (U.S. Patent # 7,075,165).

'027 teaches the semiconductor optoelectronic waveguide as previously discussed above, but is silent to wherein the impurity having a deep level and doped on the n-layer of the pn junction layer is Fe. However, '165 teaches using iron as an impurity as it produces deep level acceptor states (col. 15, lines 53 – 60). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of '027's semiconductor optoelectronic waveguide with '165's teaching of using iron as an impurity as it produces deep level acceptor states.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chad H. Smith whose telephone number is (571) 270-1294. The examiner can normally be reached on Monday-Thursday 7:00 am - 4:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 571-270-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Chad H Smith/
Examiner, Art Unit 2874

/Sung H. Pak/
Primary Examiner, Art Unit 2874